EXSTROPHY OF THE BLADDER

OPERATIVE TREATMENT WITH SPECIAL REFERENCE TO MAYDL'S OPERATION.

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OPERATIVE TREATMENT WITH SPECIAL REFERENCE TO MAYDL'S OPERATION.*

BY RUDOLPH MATAS, M.D.

The remarkable and brilliant results obtained by Dr. Allen, and the interesting practical paper by Dr. Wheaton, forcibly exhibit all the possibilities and resources of the most advanced surgical technic in dealing with this rebellious and pitiable condition, and they encourage us in the belief that the aspirations of a half century of earnest, incessant and laborious effort in a special field of surgical thought are about to be crowned with success. It is just such evidence as that presented to us by Dr. Allen that the mass of the profession has been patiently awaiting before accepting, as an accomplished fact, that which until recently has been looked on only as a hope, a possibility—the radical cure of exstrophy of the bladder. The importance and value of these contributions can not be overestimated when we consider that they are presented to us just as we have reached the turning-point between the two great epochs in the history of the subject—epochs which we would distinguish as the old or palliative and the modern or radical period.

The surgical history of exstrophy of the bladder is a fair reflex or mirror of the progress accomplished in surgery. The cure of ectopia vesicæ is a problem that has confronted and vexed the surgeon for nearly a century. The ancients simply referred to this condition and described it; to them it was a hopeless state, a

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lusus naturae which was as distant from the resources of art as it was pitiable, distressing and degrading. If we except the early and unfortunate attempts of Dubois and Dupuy, in 1806, and of Gerdy, in 1845, we find all references to the treatment of this deformity passed by in silence until the last half of the present century, when, under the impetus given to operative surgery by anesthesia, we discover the first serious and sustained efforts to ameliorate the condition of its unfortunate victims. Here and there a daring genius, more adventurous than his contemporaries, had the courage to attempt methods of relief that were in advance of the resources of his period, but these isolated attempts failed and lapsed into oblivion. To this category belong the early, daring operations of Lloyd (1851), John Simon (1852), and Roux (1853), who suggested and attempted means of permanent relief by extirpating the offending organ and deviating the course of the urinary flow into the rectum. But the failure of such early efforts is not surprising when we consider the imperfection of the technic. As in the history of many other rebellious and difficult morbid states, such premature efforts had to remain sterile until further evolution had made the conditions ripe for their fructification and fulfilment. Thus it is that the surgical treatment of exstrophy of the bladder has in the last fifty years witnessed two distinct periods of surgical activity and enterprise, during which suggestions and methods of relief have accumulated and multiplied until the literature of the subject has attained voluminous and exhausting proportions.

As characteristic of the older period, which extends from the fifth to the ninth decade of the present century, we notice the prevalence and dominance of extraperitoneal operation—the purely plastic period in which every imaginable method of utilizing the skin adjacent to the bladder is suggested and devised. It is the period which Richard, Alquie, T. Holmes, N. Wood, Lefort, Thiersch, Humberg, Rydygier, Pancoast, Ayres, Greig Smith, Pozzi and many others have enriched with their ingenuity and experience. By these meth-

ods all that was aimed at and obtained was a cosmetic and palliative effect; the protruding, prolapsed bladder was covered with skin, and the accompanying epispadias was sometimes cleverly, though more often only clumsily, relieved. These methods have been fruitful in teaching us how to overcome the obstacles in the way of plastic repair in regions which are bathed with a septic and irritating fluid, and how best to utilize the skin so as to cover a large loss of substance. But, at best, the results were chiefly cosmetic, and only helped the sufferer by making his complaint more bearable, and by placing the parts in a more favorable condition for drainage. But apart from this, what could be expected from the purely dermatoplastic methods? They were incapable of providing a sphincter which would regulate the urinary flow, and they left the unavoidable cystitis unrelieved; on the contrary, even when a small receptacle or pouch was formed for the retention of a few centimeters of decomposing urine, the growth of hair on the inner or inverted surface of the skin flap favored the precipitation of urinary salts and the deposit of calcareous incrustations, which irritated the sensitive mucosa more than ever. No better results were obtained by the suggestion of Segond, who dissected the vesical mucosa out of its peritoneal bed and used the dissected membrane to cover the penile defect (epispadias), and held it in place by a flap ingeniously borrowed from the scrotum. Nor better, functionally, is the old and original method of Dubois and Dupuytren, resurrected subsequently in a more formidable and dangerous form by Trendelenburg, Passavant, and Neurdorfer. These operators aimed at a direct approximation of the vesical edges by forcibly narrowing the pelvic girdle and approximating the undeveloped pubic arch by sections made at the sacroiliac joint and other parts in the pelvic skeleton. The peril of such violent methods, coupled with their insufficiency, even when the patients survived them, has led many operators, even up to the present, to abandon all efforts at reconstructing the bladder, or making it a useful receptacle. Many

now satisfy themselves with Sonnenberg's (1882) operation, and simply transplant the ureters from their insertion in the bladder to the root of the penis, or even into the glans, where the urine can be directed more effectually into the artificial receptacle intended for the purpose.

While surgeons were still busy pursuing the ignis fatuus of a mode of cure by purely plastic methods, others sought a solution of the problem in more radical but also more perilous directions. The old and forgotten experiments of Roux, Simon and Lloyd were revived, and, with the encouragement offered by the success of aseptic methods, the modern radical period was inaugurated by the clinical and experimental observations of Thomas Smith of London (1879), Gluck and Zeller (1881), Bardenheur, Novaro (1887), and more especially by Tuffier (1888), who obtained a unique success in the human subject by his method of extirpation of the bladder and transplantation of the ureters into the lower intestinal tract. But the results of these experiments and isolated operative attempts were almost constantly and uniformly unfavorable. Septic peritonitis and, more often a secondary pyelonephritis from ascending ureteral infection beginning at the open mouths of the transplanted ureters was almost the unavoidable and promptly fatal consequence of this mode of intervention.

Septic peritonitis, nephritis and stricture of the ureter constituted the formidable trio which had apparently combined to defeat the advance of the surgeon in this direction, and for a time the goal appeared to be as far from reach as ever. Nevertheless, the complexities and difficulties of the problem only appeared to arouse greater interest in the solution of the problem, and new methods and suggestions by which to avoid the most dangerous of the complications—pyelonephritis—soon multiplied to an almost embarrassing extent. The names of Morestin, Chaput, Giordano, Mauclaire, Harvey Reed, W. Van Hook, Kuster, Budinger, Boari, Witzel, Vignoni Pisani and Krynski are among those made familiar to

the student of the subject by the more or less practical suggestions and improvements they have contributed to the solution of this difficult question.

Nevertheless, and apart from a few isolated successes obtained in transplanting a single ureter (Chaput, Boari), the operation of ureteral grafting when simultaneously applied to both ureters had not been demonstrated to be a practical and successful operation in the human subject until Maydl, of Prague, startled us in 1893-94, with the report of two cases of exstrophy of the bladder which he had relieved permanently and happily by his original method of transplanting the ureters, including the sphincter apparatus, into the sigmoid flexure of the colon.

At first Maydl had few imitators, Bergenhem followed in 1895, then Krynski, Resigotti and Trombetta in 1896,in all five operations and five successes. In 1896 Maydl reported three aditional new cases of his own with one death. In his latest contribution[1] he tabulates a total of twenty operations, including his own, and if we now add Dr. Allen's case, we will have a total of twenty-two cases with only three fatalities. This total of twenty-two cases and three deaths, or a little over 13 per cent., is a most extraordinary record for a new operation involving delicate and difficult manipulations in the abdominal cavity. Few abdominal operations of this magnitude have been followed by such a measure of initial success as in this case, and what is more striking and encouraging is that these results have been obtained not only by the initiator himself, but by a number of operators who have followed each other in close succession in different parts of the world.

The question arises, how many cases operated on by this method have not been reported; and, again, how many of these ended fatally? The well-known aversion of most men to admit or publish their failures justifies the belief that the mortality could probably be increased if we only knew where to ferret out the facts. But, on the other hand, this argument holds equally true for the

[1] Wiener Med. Woch., 1899, Nos. 6-8.

other methods, and the fact remains that since the cure of exstrophy has been attempted by extirpation of the bladder and the grafting of the ureters into the lower intestinal tract, no record has been anywhere published which could compare in the number of cases and brilliancy of results, with that which Maydl can claim for his operation.

Are we prepared, on the strength of the evidence presented, to say with Trombetta that "the therapeutic problem involved in the radical cure of exstrophy of the bladder has found its complete solution in Maydl's operation, and that from this on it would be foolish to return to the autoplastic methods which, up to the present have so unproductively exercised the brain and hand of the surgeon." That this is not the opinion of all surgeons, and that there is still some doubt as to its superiority and greater safety over all methods recently suggested, is attested by the diverse procedures that have appeared and have been applied with variable success since Maydl's results became known to the profession. The contribution of Boari, who experimented successfully on animals, with his ingenious anastomotic button; the operations of Krynski, Vignoni, Pisani, G. Ryerson Fowler and Franklin H. Martin, are subsequent to Maydl's work, and suggest to us that these observers regard the advantage obtained by the transplantation of the elliptical piece of the vesical trigone, which contains the valvular insertion and sphincter apparatus of the ureters—a capital and distinctive point of Maydl's operation—to be illusory, or at least of doubtful advantage.

More recently still we have read in an article on exstrophy and vesical plastics by Max Rutkowski[2], an assistant in Obalinski's clinic at Cracow, that it is not in accordance with the conservative tendencies of modern surgery to sacrifice existing organs or parts of organs, provided these are healthy. He is therefore not in favor of Maydl's operation, which extirpates a rudimentary bladder, though he is compelled to admit the remarkable success thus far obtained with this procedure. He

[2] Centralbl. f. Chir., April 22, 1899.

accordingly believes in a return to plastic methods, provided these are radically modified in accordance with modern and more rational ideas. He contends that the cause of failure of the old plastic operations was due to the unphysiologic attempt to repair a defect in the urinary bladder by substituting, for mucous membrane, skin, which not only acts as a foreign body, but is devoid of muscular fibers, and serves no useful purpose in the repair of a contractile organ. He then refers to the remarkable experiment of Tizzoni and Poggi who, in 1889, succeeded in completely reconstructing the urinary bladder, which they had previously extirpated, by borrowing mucous membrane from the intestinal canal. They formed this organ out of a segment of bowel which had been separated by exclusion from the intestinal tract; they then grafted the ureters into a newly-made receptacle and thus succeeded in creating a new bladder.

In imitation of this procedure, Rutkowski very ingeniously and with extroardinary skill proceeded to cure an exstrophy of the bladder in a boy, 12 years of age, who had previously undergone Trendelenburg's and Rydygier's operations unsuccessfully. Rutkowski's procedure is as novel and ingenious as it is dangerous. He made an abdominal section above the level of the exstrophied bladder and drew out a loop of the ileum and resected 6 cm. of intestine. This section of bowel he kept alive and nourished by leaving a mesenteric pedicle attached. The continuity of the intestinal tract was then restored by circular enterorraphy, the excluded segment was split at its convexity and the mucous membrane was stretched out and sutured to the refreshed margins of the bladder. The mesenteric pedicle was sufficient to nourish the intestinal graft and then the abdominal walls were approximated so as to cover the bladder, and the boy recovered. Eight weeks after the operation he was able to retain 25 cm. of urine—over an ounce—for three-quarters of an hour, the urine being expelled in a jet at a distance of 30 cm. from the body. This is certainly a remarkable exhibition of what modern surgical technic can accom-

plish when it is reinforced by long and diligent training in a special direction.

Rutkowski's operation is certainly unique in the history of surgery, but does the survival of the patient and the result obtained justify the risks involved in the procedure? Does it convince us that the author's argument in favor of a revival of the plastic treatment of exstrophy has been demonstrated to be correct by the results obtained in this case? Can such a result remarkable as it is, compare for an instant with the final results of Maydl's operation? No! The only advantages that we can appreciate in Rutkowski's operation lies in the fact that the ureters are not disturbed from their attachment to the bladder, and that the dangers of septic pyelonephritis are obviated, but in every other respect it is a failure when we consider the functional result as compared with such cases as those reported by Dr. Allen and other surgeons who have followed in Maydl's footsteps. We believe that we are safe in prophesying that Rutkowski's case is destined to remain a unique precedent of its kind in operative surgery, and that it is not likely to find many imitators.

The operation that now remains for our consideration, and that must command our attention, is Maydl's operation, and our efforts should be directed toward perfecting its technic in order that its risks and dangers may be reduced to the safest minimum. The dangers that must be apprehended in this procedure are, in brief: 1. The sloughing of the valvular insertion and sphincter apparatus of the ureters, after this has been severed from its vesical connections and transplanted to the bowel. 2. The possibility of contaminating the peritoneum in the course of the vesicocolostomy, and subsequently, if sloughing should occur after the operation has been completed. 3. The possible failure of the valvular insertion of the ureters to serve efficiently after the vesicoureteral graft has been successfully implanted into the bowel; in which event there is nothing to prevent the dreaded and fatal infection of the ureters and kidneys. 4. The existence of a congenital anomaly in the sigmoid

or omega colon, in which the mesentery is so short that it will be impossible to drag the colon to the median incision, thus seriously complicating the technic, as in Park's fatal case.

The operator who cuts off both ureters from the bladder, and transplants them into the colon must experience a certain and unavoidable anxiety—an anxiety that only further experience will overcome—that is born of the feeling that he has burned his ship behind him and has staked all his patient's chances, all his hopes, in the hazard of the game. It is the utter and absolute hopelessness of remedying the evil when this does occur that must make any conscientious operator vacillate and question his mind and his responsibility many times over, before deciding to embark in so perilous an undertaking. But is this an argument against Maydl's operation in particular? Again, No! For the dangers that we have referred to apply equally as well, and indeed with much greater emphasis, to all the methods of ureteral grafting alike. The danger of sloughing of the bladder graft, with its attendant dangers, which is uppermost in the mind of the operator, has been to a great extent dispelled by the careful anatomical researches of Margarucci, who demonstrated at the Twelfth International Congress, held in Rome in 1894, that the ureter is nourished by an independent vascular supply which, descending from the renal side, supplies not only the ureters but the mucous membrane about its orifice, where it forms an anastomotic connection with the vessels of the vesical trigone. This is a most reassuring fact. In addition to this, the danger of ultimate stricture from cicatricial contraction of the ureteral orifice is certainly obviated by Maydl's operation in a manner not equaled by any other operation, Krynski's, Martin's or Fowler's operations, which are the next best, not excepted. But, finally, more convincing than anything else, is the real test of merit and value, the accumulated evidence of the clinical test, which indisputably demonstrates that no other operation has thus far succeeded in overcoming the risks of renal infection with more certainty and success than Maydl's procedure.

We have purposely left out of consideration the question of intestinal and rectal intolerance, because it has been abundantly demonstrated that the rectal and colonic mucous membrane will readily adapt itself to the conditions of a urinary receptacle.

Personally, my attitude toward the cure of exstrophy of the bladder by the radical method has been most conservative, and, furthermore, my conservatism has not been influenced by the recorded experience of others, but chiefly by the results of my own experience. My disgust at the unsatisfactory functional results of the classic autoplastic operations as observed in my own practice, has kept my interest ever alive to the possibilities of other methods. I have now two cases of exstrophy in which I would have long ago attempted Maydl's operation had it not been that my lack of success with ureteral transplantation in dogs made me timid and kept me from attempting the operation on the human subject. In 1896 I read Boari's communication in the Policlinico of Rome, in which the application of his ingenious buttons, devised for ureteral anastomosis, was presented in a seductive manner. I immediately sent to Italy, to the author, for a set of models, and proceeded to experiment with them without delay. I followed the technic as faithfully as possible, on two dogs, but both animals perished promptly from acute ascending renal infection. The technic was simple and beautiful, but the results were bad. This convinced me that the direct anastomosis of the ureter into the bowel without providing for a valvular arrangement was untrustworthy and should be rejected. In 1897, I undertook to perform Maydl's typical operation on two dogs; the bladder was extirpated in each and the ureters, with the elliptical flange of the vesical trigone, were sutured to the rectum. Both dogs died, one in twenty-four and the other in thirty-six hours after the operation. In both the vesico-ureteral grafts were perfect; there was no sloughing, and there was no urinary or fecal leakage; in both, however, there were evidences of septic peritonitis, caused no doubt by infection from the bowel during the course of the operation; in

the dog that survived thirty-six hours there were also evidences of a very intense hyperemia of the kidneys. I am fully convinced that the operation is much more simple in the human subject and less likely to be followed by septic infection, as contamination from the bladder or bowel can be much more efficiently guarded against—especially if the sigmoid mesocolon is long enough to permit the bowel to be dragged out of the median incision.

I would summarize my impressions as follows:

1. All autoplastic methods proposed for the cure of exstrophy of the bladder are unsatisfactory and, at best, simply palliative.

2. Of all the radical methods which involve an excision of the bladder and a transplantation of the ureters to the rectum, Maydl's operation is by far the most complete, rational and satisfactory, from the technical point of view.

3. Maydl's operation offers the best conditions for the complete correction of the associate epispadias.

4. Notwithstanding the comparatively large number of successful cases accredited to this method, its relation is not yet fully ascertained, though the ratio, as obtained from published cases—over 13 per cent.—establishes the superiority of this method above all others from the prognostic point of view.

5. Notwithstanding the apparent theoretic simplicity of its technic, Maydl's operation is a difficult, laborious, and in many respects a dangerous, operation and should only be undertaken by those who have thoroughly familiarized themselves with its difficulties by special training in abdominal surgery, supplemented, if possible, by experimental work.

6. It should not be applied indiscriminately to all cases, but only to those patients whose general condition is such as to warrant a long tedious operation likely to be attended by serious shock; and whose eliminating organs, especially the kidneys, are normal and capable of effective elimination.

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